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133 On the other hand, the limestone islands (e.g., Fulanga) have cliffs and
137 forested low plateaus, which tend to erode into basins whose sharp-crested rims drop steeply to the sea. They have no valleys or streams, all the rainfall sinking underground and reaching the sea by an intricate system of subterranean caverns. Except in Namuka, where the soil is relatively deep, only a
[134] thin layer of rather poor topsoil occurs in pockets in the interior basins. Such limestone soil supports a distinctive flora. Useful hardwoods, such as the greenheart of India (*Intsia bijuga*), *mbau* (*Pittosprum brackenridgei*) and *makota* (*Dysoxylum richii*), as well as other jungle plants which are absent or scarce on the volcanics, flourish on the limestones of southern Lau. However, yams do not grow well in this type of soil. Apparently these islands had no horticulture before manioc and sweet potato (*Ipomoea batatas*) found their way to Lau in historic times.[7]

In sum, good garden land and food are generally limited on the limestone islands but plentiful on the volcanics, while forest products are scarce on the volcanics but abundant on the limestones. Thus, the resources of the two geolog-
[438] ical types complement each other, the fifteen islands forming a naturally balanced community or self-sufficient native trade area.

● 13 The foundations of this ecological arrangement extend far back in the geological history of the region. On the basis of paleogeological evidence, Ladd and Hoffmeister[8] infer that organic life in the island community under consideration began during the Lower Miocene before the Lau group had emerged above sea level, and it played a major part in the formation of the various islands and in laying the foundations for their present ecological structures. As soon as the islands projected above the level of the sea and the processes of erosion began to develop topsoil, we assume that the fundamental biotics of each island began to develop—limestone biotics on the limestones and volcanic biotics on the volcanics.

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shrubs and stunted trees; and scattered *Pandanus* and *Casuarina*. The dominant littoral species are: *ndilo* (*Calophyllum inophyllum*), *vutu* (*Barringtonia speciosa*), *evu* (*Tournefortia argentea*), *evuevu* (*Hernandia peltata*), *nawanawa* (*Cordia subcordata*), *tatang-ngia* (*Acacia lauriflora*), *vevendu* (*Scaevola koenigii*), *tavola* (*Terminalia littoralis*), *ndrala* (*Erythrina indica*), etc. Besides these there are the usual *Pandanus*, numerous vines and groves of coconut palms."

[7] According to Bryan (MSS.): "All the limestone islands . . . support one type of forest. It is made up throughout the group of the same fifty or so species of trees and tall shrubs, with an undergrowth of *Piper* (*wangawa*), bird's eye pepper (*rokele*), ferns, herbs and several vines. The luxuriance alone depends upon the size and elevation of the island. There is an interesting, rapid and progressive increase in the number of species and the height of growth, from the nearly bare rocks, such as Latei Viti and Bacon Island with but two or three species of prostrate herbs, to the splendid forests of Kambara, Mango, etc. First to appear after the herbs and vines are low, stunted trees of such widespread species as *Hernandia peltata*, *Tournefortia argentea*, and a *Ficus* with orange fruit commonly eaten by pigeons. A few of the small islands have native palms in considerable numbers. *Pandanus* and *Casuarina* appear early in the scale."

[8] Ladd and Hoffmeister, 1945; Ladd, 1934.

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While we lack the data to describe these two types of biotics, we do know that their development in Lau has been influenced and limited by the following major factors.[9] First, rocks are of only two types: impervious volcanic and soluble limestones. Second, most of the islands are small, isolated, and closely surrounded by open sea at least 100 fathoms deep. They are separated from the main Fiji group to the northwest by a distance of some 200 miles and from Tonga to the southeast by some 400 miles. Third, located mainly between 17 and 19 degrees[10] south latitude and in the vicinity of 179 degrees west longitude, the Lau group has a tropical climate, the mean annual temperature being estimated at about 73 degrees Fahrenheit, the humidity range from about 70 to 90 per cent. Fourth, the islands lie in the belt of the southeast trade winds which prevail during the cool, dry season from April to November. This condition is strongly reflected in reef and island contours and in rock type distributions. During the remainder of the year, the warm, wet season, the southwest monsoon blows intermittently, especially from January to March when hurricanes may be expected. Fifth, practically all of the annual precipitation, which averages about 80 inches, falls during the wet season, much of it in the form of torrential downpours which erode basins and caverns in the limestone islands, and valleys in the volcanics. Sixth, the basic ecological balances of each island developed in the absence of large land animals, including man.[11]

By the time that the first men arrived in Lau in comparatively recent times, the delicately balanced, natural ecological arrangements, characteristic of southern Lau, had attained their basic patterns. The advent of man meant much more than the intrusion of a single species, namely *Homo sapiens*, as had been the case when many ocean- or air-borne species found their way to these islands. The advent of man meant the intrusion into the group of a whole complex of exotic species of both fauna and flora carried by man during his migration by canoe eastward into the Pacific basin. Culture-historical evidence in southern Lau[12] suggests that these included the pig, the dog, and the fowl, as well as various food plants such as yam, breadfruit and banana. Man brought, furthermore, various stone and shell tools such as adzes, gouges, awls and pounders with which he could somewhat alter the face of nature; various skills, such as fire-making, horticulture, stone-cutting, house-building,

[9] Ladd and Hoffmeister, 1945; Bryan, 1948; Thompson, 1940a, 1940b.

[10] Vatoa and Ono-i-Lau lie farther to the south, and accordingly have a slightly cooler climate.

[11] According to Bryan (MSS.): "Except for birds and insects there is a poverty of native animal life in Lau. The only mammal noted was the rat. About a dozen species of water birds and over 28 species of land birds were encountered throughout the group. Two species of land snakes and one banded water snake were caught. Lizards of various species were abundant. The largest was the green *vokai*. Various sizes of geckos and skinks were more abundant. Land crabs, including the large 'coconut' crab and hermit crabs, were present in quantity."

[12] Thompson, 1938.

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basketry and mat-plaiting; and he brought the sailing canoe with which he traveled between the islands and connected their heretofore disparate ecological arrangements.

Not much is known of these first human inhabitants of Lau but, on the basis of internal evidence in the present-day culture and of archeological findings,[13] we infer that they settled on the larger islands and formed small clan hamlets in the bush. On the limestone islands the aborigines subsisted chiefly on jungle fruits, edible green leaves from the bush, fish, pigs and fowl, while on the volcanics this basic diet was supplemented with such garden produce as yams.

After the first men arrived, a new ecological arrangement seems to have gradually taken form on the basis of the old; and recently introduced species of flora and fauna, including *Homo sapiens*, became a part of the total balance. The culture of the first human inhabitants of Lau indicates that, on the foundations of attitudes and behavior patterns which they had brought with them into Lau, the aborigines developed a culture which integrated the human group with the other species of the natural community in environmental context and which symbolically explained, validated and supported the group's way of life.[14] What the effect of the aborigines was on the environment we do not know. It has been suggested, however, that man's cultivation of the volcanic islands has been responsible to some degree for the fact that much of their flora has degenerated to rank grasslands and other low growth. The limestone localities, on the other hand, apparently were and still are less affected by man's presence. The soil is less fertile and less responsive to cultivation of food plants by means of technology available to the natives, while the low, dense, scrubby forest, its tangle of underbrush, together with the rough, pitted terrain, help to discourage change through human activity.[15]

The next major event in the culture history of the area was the conquest of the aborigines, apparently about fifteen generations ago, by a small band of warriors reputed to have come from northwest Viti Levu in west Fiji. Marrying aboriginal women who brought them parcels of land, the conquerors settled on the more fertile islands and founded new clans. The newcomers were very different in skills, interests and values from the aborigines. They were a raiding, fishing people who preferred to sail and gather their food from the sea rather than to till the soil. The conquerors, moreover, were fascinated

[13] Thompson, 1938, 1940b.

[14] In time apparently the migration of their ancestors from the west was forgotten and the aborigines of Lau came to believe that they had originated locally in some natural phenomenon, such as a tree or an animal. The people of each island also had a species of bird and a species of fish which was sacred to them, and they believed in a local abode of the dead. Their deity was apparently a great, pervasive, spiritual power believed to be the source of all *mana* and was worshiped at sacred places such as caves, trees or stones. [15] Bryan, 1948.

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by their genealogies and by the idea of rank based on male primogeniture and they introduced ancestor worship into Lau.[18]

The aborigines and their descendants, however, kept most of the land, their food-producing patterns, and their basic ecological adjustment to the environment. They also kept their nature religion, related to that adjustment, and many of their traditional attitudes and values. In time manioc and sweet potato, exotic food plants which made gardening possible to a limited extent on the limestone islands, found their way into Lau, allowing an increase in food production and population. Gradually, on the basis of ancient structures, the ecological and cultural pattern of the area developed a new balance. Although Tongan and European influences have somewhat altered it in recent years, in that warfare has ceased and most of the Lauan religious practices have been lost due to missionary influences, the basic structure of the eco-cultural arrangement apparently persists to the present in southern Lau.

Space would not permit a complete description of Lauan culture from the total ecological viewpoint even if the available data allowed it. It will suffice for our purpose to note certain aspects of the productive and distributive system in ecological context. The food problem looms large in this community on account of many interrelated factors. Among them are the frequency of drought and destructive hurricanes in the area, the scarcity and poor quality of garden land on the limestone islands, the fact that most manioc (staple of the limestones since its introduction) is inedible before it has been processed by a tedious operation to remove the poison, and the difficulty of preserving and storing food in the tropics under native conditions.

Under such circumstances we might expect the diet of the Lauans to be deficient both in quantity and in nutritional balance. No systematic studies of diet have been made in this area, but we note that to be satisfactory from the native viewpoint, a meal, or a feast must consist of two parts: 1. steamed "true food" (called *kana nichina*), namely a staple such as yam, breadfruit, sweet potato, manioc, or Tahitian chestnut (*Inocarpus edulis*); and 2. a boiled relish (called *mboro*) made of fresh green leaves, fish and coconut "cream," seasoned with bird's eye pepper. Pigs and sea turtle are feast foods. This pattern of diet requires little or no fresh water in a community where fresh water is exceedingly scarce, another adaptation to the environment. Moreover, it appears to be well-balanced from the nutritional viewpoint, the "true food" providing the bulk of carbohydrates, some proteins, fats, minerals and vitamins, while the relish furnishes proteins of superior quality and fat (i.e., from

[18] They set their clans up over those of the aborigines as a noble class, each clan having three species sacred to it, namely a tree, a fish and a bird. They required that their first-born males be regarded as sacred chiefs and be rendered tribute by the people in the form of first fruits. They developed a system of worshiping their warrior forefathers by means of hereditary priests in small temples.

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ripe coconut "cream,")[17] as well as certain indispensable vitamins and minerals found in fresh green leaves and red peppers. Furthermore, although food does not drop off the trees and rot on the ground (as it does on many Pacific islands—e.g., in Guam before the last war), the Lauan diet appears, under native conditions, to have been relatively adequate in quantity except in time of hurricane or drought.

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The traditional diet of the Lauans is the result of a complicated and ingenious structure of attitudes, habits and institutions which function to develop and reinforce the basic ecology of the area according to the needs of its population, and to relate and adjust the community as a whole to the total environment. To gain some insight into this structure, let us begin with the daily menu. The Lauans eat only one main meal a day, at about sundown, and the major activities of both sexes are directed toward procuring and preparing the food for this meal. The men and boys of the household are responsible for the daily supply of "true food" for their own group and this they either raise in the household's garden land or collect from the bush. They then carefully prepare it, wrap it in leaves, place each package of food in the earth-oven pit on stones which have previously been heated, cover the whole with leaves and earth, and allow it to steam for at least an hour. The women and girls of the household, on the other hand, are responsible for the relish. They collect fresh green leaves daily—either edible leaves from the bush or sweet potato leaves from the garden. The women also collect shellfish on the reef or fish with nets in the lagoon and they clean the catch on the beach. Then, at the household kitchen huts, they pick leaves from stems, grate and strain the fatty flesh of ripe coconuts to make coconut "cream," and boil the mixture with fish and pepper in pots for at least an hour over a wood fire.

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When both parts of the meal, the "true food" and the relish, are finally ready, they are combined and divided into shares, one for each member of the household according to rank, age and sex. Thus the two parts of the daily meal are always procured and prepared separately. Indeed, no woman is allowed near the earth-oven, which is strictly a male domain located some distance from the kitchen hut. This complementary and balanced sexual division of the rather time-consuming labor of meal-getting functions effectively toward insuring that the daily diet will be reasonably adequate, varied, and sufficient

[17] The proximate composition of "coconut cream" is: protein, 3.55%; fat, 33.15%; carbohydrate, 8.62%; calories per 100 grams, 347. (Concepcion, 1947). On this point, Emma Reh, nutrition officer, Food and Agriculture Organization of the United Nations, writes, "The protein content of 'coconut cream' is fairly high considering this is a liquid product. The protein is of good quality, like proteins of pulses, oily seeds and nuts, and superior to those of cereals, starchy roots and other vegetable foods. It is rich in most of the amino acids essential in nutrition. The fat content of the 'coconut cream' is also high, but the fat is low in the unsaturated fatty acids needed by the body. The requirements are however small, and probably met by fats contained in other foods." (Reh, 1948).

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in quantity to fulfill the needs of the group, without placing undue burden on either sex or on any one individual. The method of sharing the feast tends toward a systematic, equitable distribution of food within the household group.

Now it should be noted that, for the self-maintenance of this diet pattern, each household must have access to three types of resources: namely, garden land, bush, and fishing grounds. With this point in mind, let us glance at the system of land use in southern Lau.[18] After the British took over the Fiji Islands in 1874 and peace was established between native factions, the clan-hamlets moved out of the interior of the Lau islands and settled on adjacent lots on the windward[19] shores, forming coastal villages. But they kept their ancient land divisions and proprietary clan rights. Volcanic islands like Mothe were divided into pie-shaped sections bounded by natural ridges which separate the fertile valleys, and each clan had the use of the garden lands, uplands, and fishing grounds of the section wherein its hamlet had formerly been located. On limestone islands like Fulanga where the valley and ridge conformation is absent, land sections were not pie-shaped; but a similar principle of land division nonetheless prevailed. Formerly the bush and fishing grounds in the vicinity of each site occupied by a clan-hamlet, its jungle fruits, garden lands, and other resources belonged to the hamlet. Each household within a clan-hamlet had the use of a piece of the hamlet's garden lands and all the households of the hamlet together had access to the hamlet's bush and fishing grounds.

After the establishment of coast villages, the bush and fishing grounds belonging to the clans of a village were used in common by the whole village group, but the ancient division of garden lands by clans and households persisted. Furthermore, certain clans or villages claim ownership of one or more of the small uninhabited limestone islands in the community. For example, Naivotavota clan of Nggalinggali village on Kambara claims the island of Wangava and its members supplement the crops they raise on their meager garden lands on Kambara with those they raise on Wangava, and also use Wangava's rather extensive forest and lake products. Undu village on Kambara claims ownership of the island of Marambo and uses its resources. Indeed, all the uninhabited islands of the community are claimed and used to supplement the resources of the owning groups. Thus the land use system of Lau is closely related to the basic ecological arrangement of the area and functions to insure a balanced distribution of various types of island resources among the local groups of each island and to render accessible to each household means of obtaining a balanced daily diet.

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[18] For details *see* Thompson, 1940a, 1940b.

[19] Except Tokalau and Lomatchi located on Kambara's leeward shore near the anchorage.

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The traditional diet was further safeguarded by an ingenious and self-regulating system of co-operative production and distribution, which encompassed all the local groups in the community. On each inhabited island an hereditary officer called the *vaka vanua* is custodian of the jungle fruits and crops. The traditional role of the crop custodian was to watch the island's food supply and, as each major food crop (whether wild or cultivated) matured, to place a tabu on it. When the custodian considered the crop under tabu to have ripened sufficiently, his traditional role was to remove the tabu and to arrange for the collection of first fruits by village and clan groups. The first fruits were then placed on the village ceremonial ground (*rara*) and divided by the custodian into two portions, one for the island chief and one for the people. The chief's portion was presented to the chief ceremonially by the custodian or by another officer of the aboriginal class, called the *takala*. The portion of the first fruits reserved for the people was divided by still another officer, called the headman of the ceremonial ground (*tui rara*),[20] a title hereditary in an aboriginal clan. It was the responsibility of this official to divide the food so that each clan received a fair share. When crops were abundant, part of the first fruits were set aside to be fermented and stored against time of scarcity. After the first fruits ceremony the people of the island were free to gather the remainder of the crop, each group from its own lands.

In this island community where food was none too plentiful and famine a constant threat, the institution of the crop custodian functioned, in total context, to conserve and augment the food supply of each island by preventing the crops from being consumed before they had attained their full size and maturity and their highest nutritive value. It thus served as a public health and resources conservation measure of considerable significance to guard against famine, to obtain the optimum size and food value of the crops, to insure a more equitable distribution of the limited food resources of the community as a whole, to build up community health through more adequate nutrition, and to accumulate a surplus in times of plenty for use in times of scarcity. It should be noted that on each island only the major food crops were placed under tabu. These differed from island to island and from season to season, depending on local conditions as judged by crop custodians, and thus the custodian institution had considerable flexibility.

When the British system of indirect rule was established in Lau, however, the office of crop custodian was not incorporated into the administrative set-up. Indeed, its very existence was probably unknown to Europeans. Moreover, the Lauans soon became confused as to which chief should receive the offering of first fruits—the traditional island chief, whose office had not been recognized officially in the new government system, or the local village chief, an

[20] The *tui rara's* functions were performed on Fulanga by the *tui naro*, an aboriginal clan title.

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officer newly created by British regulation. Consequently the crop custodian, although continuing to function in a limited way on all the inhabited islands of the community (except Namuka where the crops abundantly cover the needs of the population), has lost considerable authority and prestige. The number of fruit and garden crops placed under tabu for first fruits presentation has decreased in number, at least part of each crop being consumed before it has fully matured, especially on the limestone islands. Food is rarely stored against time of famine, and in general the crops are smaller in size than formerly and less valuable from the viewpoint of nutrition.

As part of the production and distribution system mentioned above, each inhabited island also had a master fisherman (called *ndau ni nggoli*), who had charge of all the island's fishing grounds, communal fishing expeditions and turtle hunts. The office of master fisherman is held by a clan belonging to the noble class, except on islands where that class is absent. The traditional role of the *ndau ni nggoli* was to master the fish lore and fishing techniques of the island and to study the habits of various edible species of marine life in relation to the local fishing grounds, the tide and currents, the weather, the lunar cycle, the seasons, and the presence of noxious plants which render edible species poisonous to man. Although men and women caught fish offshore singly or in groups of two or three by means of nets, lines, and spears for their daily household needs without special permission from the master fisherman, they observed his regulation of the fishing grounds and no large, organized fishing expeditions took place without his sanction. Indeed, the master fisherman himself organized and led all communal turtle hunts and most large fishing parties. Women's communal fishing was led by the wife or daughter of the *ndau ni nggoli*.

The institution of the master fisherman functioned to increase the total catch by protecting the local fishing grounds from over-fishing and undue disturbance, and by taking advantage of the various group-fishing techniques in relation to the weather, the seasons, and the habits of various edible species. In a community where fishing provided the major protein constituent in the daily diet and an indispensable part of every feast, this institution operated as a public health measure of prime importance in creating and maintaining a balanced relation between the community and its marine food supply. The traditional functions of this institution and its ecological significance are clarified by the fact that, although the prestige and authority of the master fisherman have not been reinforced by the British and consequently this native official has lost status, he still operates unofficially to a limited extent on every inhabited island in the community. As a result of his lowered status and decreased power, however, informants say that the fishing grounds of the various islands are more disturbed than formerly, that there are fewer organized fishing expeditions, and that the catches are smaller than they used to be.

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13 431 438 Another institution which is part of the total system under discussion is the intervillage ceremonial exchange, called *solevu*. Food from the volcanic islands is exchanged for craft goods such as mats, barkcloth, wooden bowls and canoes from the limestone islands, by means of the *solevu*, a complicated pattern of exchange between related villages based on an adaptation of the ancient ceremony used in the presentation of first fruits, mentioned above. Along with the public ceremonial exchange of goods between the two participating villages, there occurs during the four days of the *solevu* a certain amount of private exchange of gifts and barter between related individuals from the two villages. This gives a high degree of flexibility to the arrangement. The *solevu* also provides an occasion for the exchange of feasts, dances, and songs between the two groups and for intervillage games and sports.

The institution of the *solevu* functions not only to provide a pleasant interlude in the daily routine of hard work necessary to group survival in southern Lau, but also as an efficient and self-regulatory "mechanism" to stimulate production of food and craft articles and to expand the system of distribution of each island to include a group of both limestone and volcanic islands whose complementary resources form a natural trade area. We have noted how the institutions of the crop custodian and the master fisherman, in the ecological context of each island, function traditionally to increase in size and nutritive value the local food supply and operate toward its more equitable distribution. We now observe that the *solevu* provides an integrating, logical link in the total productive and distributive system which unites the various islands of the community into a balanced, interdependent and co-operative whole whereby sectional differences in resources are transformed into assets and each group, regardless of its resources, is enabled to obtain what it needs for a balanced diet and economy.

13 431 438 178 The importance of the *solevu* in the total economy of southern Lau is brought into relief by the effect of its prohibition by the Colonial Government. Some years ago British officials outlawed large ceremonial exchanges in Fiji, because, it was said, they thought such a prohibition would prevent waste of needed energy and resources. Doubtless, in other parts of Fiji, where food is more plentiful, there was a wastage of resources in connection with the *solevu*. The effect of the regulation in the community under consideration, however, was not to abolish the *solevu* but rather to reduce the number of *solevus* held in the area. This in turn tended to reduce the output of craft goods, especially mats and barkcloth, the main *solevu* craft goods. According to the local division of labor, mats and barkcloth are made by the women, who also tend the babies, care for the houses, and, as noted above, procure and prepare part of the food. The men, on the other hand, besides their food producing and cooking functions already noted, hunt and fish with spears, care for the pigs, build and sail large sea-going canoes, trade between islands, and produce wooden bowls and

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sennit. This nice balance of labor between the sexes in Lau has been disturbed by the diminution in the production of women's crafts, due mainly to the government's prohibition of the *solevu*, the women being left with a considerable amount of time on their hands which they formerly used in creative activity. The men, on the other hand, tend to labor more than ever, trying to compensate for the diminished food supply. But since garden lands are insufficient in quantity and quality on most islands to cover the needs of the population without importing food, regardless of the amount of energy expended in gardening by native methods, food is scarcer than ever. It should be added that, although the supply of hardwoods, found only on the limestones, is limited, there seems to be little danger that the forests will be depleted by the small amount of timber cut for canoes and craft goods by means of native technology. Thus, instead of operating to prevent wastage of energy and resources, the prohibition of the *solevu* actually operates toward throwing out of line the nicely adjusted system of food production and distribution and the balanced sexual division of labor in the community, reducing the work and creativity of the women, increasing the work of the men, and engendering a food shortage on many of the islands.

The entire system of production and distribution described above, it should be noted, is basically accommodative and co-operative, and it is effected with a minimum of coercion, since rewards in the form of group prestige go automatically to the group (and incidentally also to the individual) who willingly gives or contributes most to the whole. Stinginess means loss of prestige. Within the system, however, rivalry between groups functions as a creative stimulus toward the goal of increased production of high quality products and more equitable distribution of these to the whole community. Apparently it is an indispensable ingredient contributing toward the self-maintenance and self-regulation of the system. Moreover, institutionalized, competitive group-giving prevents the development of an economic monopoly which might otherwise emerge in an area where the distribution of local resources is irregular and where rank and status are highly developed. Under it not even the chiefs may keep their tribute but rather, under penalty of losing face, must redistribute it to their followers. Thus, traditionally, the system prevents the accumulation of wealth in the hands of any one group or individual, and it insures that community resources will remain available to the whole group for immediate use according to need.

Before concluding we should note one more point which is vital to an understanding of the Lauan system of production and distribution described above. Despite its fine adjustment to the ecological setting and its basically self-perpetuating nature, this system could not operate effectively unless it were counterbalanced by a psychocultural arrangement which functioned to regulate and limit the size of the human population in relation to the resources of

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the community made available by the indigeneous technology. Analyzing Lauan culture from this viewpoint, we find a complementary set of institutions which do actually tend to function toward just this end.

For example, after the birth of a child the father moves out of the family dwelling and sleeps in the men's house of the clan. He is not allowed to have sexual intercourse with his wife until the baby is weaned, a period of from nine months to two years. The strict observance of this custom is attested by the fact that siblings in Lau are almost without exception at least eighteen months apart. Thus the men's house complex, correlated with certain tabus, functions as a means of birth spacing and population control and of protecting maternal and infant health. Ritual continence was practiced in Lau on many occasions. Several methods of abortion were used, mainly by unmarried mothers. In Fulanga old people who had outlived their usefulness, according to native standards, were formerly abandoned on a small island in the lagoon. Where chieftainship was highly developed, those who broke tabus concerning the nobility were clubbed to death. Raiding between villages, in the course of which men, women and children were killed, was not infrequent in the group, and those who were captured, regardless of age or sex, were consumed by the victors at cannibalistic feasts. These are some of the Lauan practices which, together with accidents, hurricanes, disease, and a rate of infant and maternal mortality which was probably rather high, tended to limit the size of the population in relation to the available resources within the natural and cultural setting. Although in historic times Fijian population totals were greatly reduced, especially by the ravages of white man's diseases, the low point was reached at about 1911. Thereafter the trend has been slowly upward. The population of southern Lau gained 155 per 1,000 between 1921 and 1935.[21] At the time of the present field work, the population of the community was about 1,500.

Certain significant generalizations which grow out of the foregoing analysis may now be formulated.

We noted that in our island community a unique and balanced biotic system developed in isolation over a very long period of time and in the absence of large land animals. The advent of man, which occurred relatively late in the ecological developmental sequence, introduced not only a new species, namely *Homo sapiens*, into this natural community but also other fauna and flora, as well as the artifacts carried by man as part of his cultural equipment. Still more important, perhaps, it added human cultural processes to the fundamental ecological processes already operating in the area. In a relatively short time, from the eco-historical viewpoint, there emerged, on the basis of the ancient biotics, a new eco-cultural structure which involved plants, animals

[21] For details *see* Thompson, 1940a, p. 137.

● 13 1. ONGEA Islands consist of three limestone islands situated at the south-east end of the group; (S.19° 10', 178° 25' W.). They are encircled by a barrier reef 5 1/2 by 8 miles, thru which there is one good (Barracouta) passage on the west side.

Ongea Levu, the largest of the three, is elongate eliptical in outline, 3 1/2 by 1 1/4 miles, with a deep sandy bay on the south, [361] at the head of which is located the village. The central portion is a flat, rising to a height of 270 feet on the east in a nearly continuous line of hills facing the sea, and sloping up slightly to the west and north.

The south-west portion of this main mass is a separate island, called Yamuia, which is separated from Ongea Levu by a narrow, winding passage, nearly dry at low tide. It is hilly and rough, with an elevation at the north-west of 220 feet, rising sharply from the sea. The south-eastern portion is much indented and filled with mangrove swamps. Both ends of the passage are filled with small rocky islets, a line of which also fringe the south coast of Ongea Levu and the shore line of Ongea Ndriti.

Ongea Ndriti, which lies about a mile to the south of Levu, is ovate in shape, 1 3/4 by 1 1/4 miles. The eastern and western ends are rough and hilly, rising to an elevation of 300 feet. The north center is a partly cultivated flat, and there is a broad sand beach on the south.

All three of the islands are of typical upraised coral limestone formation, and are covered with a dense growth of lowland forest. Most of the sea face is steep undercut cliff, but there are several small sand beaches.

The best anchorages for vessels of moderate size are off the north-west end of Ongea Ndriti, and off the north end of the deep bay on the west side of Ongea Levu. At both of these landing is good.

[p.12]

[ONGEA ISLANDS]

13 [487] From the latter[1] a good trail leads across the central flat to the village. The bay on the south side of Ongea Levu is too shallow for vessels larger than small cutters to enter.

317 There is no fresh water other than rainwater which is caught and stored in a cement cistern at the village.

136 No wild animals other than rats, lizards and snakes occur on these islands. There is a large green lizard called "vokai" by the natives, and one (perhaps two) species of gray-brown snakes. The natives report wild goats, but neither they nor their tracks were seen..

361 [161] 241 All the inhabitants, about 100 in number, live in the village on Ongea Levu, but they cultivate considerable areas on both Levu and Ndriti. The principal products raised are manioc, sweet potato, 245 yams, taro and bananas. The coconut groves are not so extensive as the area of the islands would permit, but they apparently produce sufficient copra to supply the humble wants of the natives.

181 144 320 285 287 231 The people are industrious and fairly intelligent despite their isolation. There is a more or less distinct Tongan cast. Wood carving, mat weaving and tapa beating are carried on to some extent, and numbers of canoes are cut in the thick woods. Pigs and a few fowl are raised, and dogs are kept as pets.

[1] [i.e.—anchorage on the west side of Ongea Levu. --Analyst]

[p.13]

●13 2. FULANGA Island is a nearly continuous ring of uplifted coral limestone, eight miles directly west of Ongea Levu and south of the Yangasa Cluster, (S.19° 08', 178° 36' W.). It is 5 miles long (W.N.W.- E.S.E.) and 3 to 3 1/2 miles wide. The main island, which extends around three-fourths of the circumference, is from 1/4 to 1 mile wide, and reaches an elevation of 260 feet at the north-west and from 200 to 240 feet on the south. The remaining forth consists of a curve of small islets, one of which is 150 feet high. The hills on the south form a nearly continuous ridge, but those on the north are more prominent because of their isolated abraptness. The enclosed lagoon contains several fair size islands and a quantity of small mushroom-shaped rocks (too small to be indicated on the map).

This ring of land is surrounded by a barrier reef which is fringing on the S.E. and S.W. Thru it there is one passage available for small vessels, on the N.W. side. This passage is but 60 yards wide with a strong tidal current flowing thru it at about 3 knots, and causing riffles and overfalls dangerous to small vessels, which should not attempt the passage when tide and wind are opposite in direction. A patch of coral just inside the entrance should be carefully avoided, by running close up to a small rocky islet covered with native palms, keeping on its west side, and then turning abruptly south-west.

The lagoon furnishes shelter from all points of the compass. A good anchorage is available at about the middle of the south side, off [504] a small sandy bay where there are generally a number of native canoes [487] on the beach. From here a trail leads over the ridge to the two southern villages.

[p.15]

[FULANGA I]

312 Water is available only at the villages where rainwater is caught and stored in cement tanks.

● 13 The limestone hills are thickly covered with the usual lowland forest. The flats on both sides support extensive groves of coconut palms and cultivated areas. Mangrove thickets border the S.W. side of the lagoon.

The animals include birds, rats, lizards and probably snakes, although none of the latter were seen, except the banded water snake.
[231] The natives have domestic fowls, pigs and dogs. Mosquitoes present.

361 There are three small villages on Fulanga. Muanaithake
[161] and Muanairs are close together on the south ocean side. The former has a population of about 200, living in 40 houses; the latter is much smaller, about a dozen houses and 40 inhabitants. Naividamu is situated on the N.W. arm, on the lagoon side. It has a population
487 of 64, living in a dozen huts. The three villages are connected by a good path.

181 The people appear prosperous and fairly industrious. The women
462 catch fish and dive for shell fish and oysters within the lagoon. The
[226] men do the reef fishing and cultivate the fields. Canoe making and
241 some carving is done, and the women weave mats and beat out masi (tapa
[320] Some little copra is cut and shipped and the usual crops of sweet
285 potatoes, yams, manioc and bananas are grown, the latter for local
[287] consumption only.
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[p. 16]

● 13 5. NAIAMBO is a very small, flat, sand and coral islet, about 150 by 250 feet, surrounded by a nearly square reef, less than a mile across. It is ten miles north of Ongea Levu and six miles east of Yangasa Levu, with two small patches of reef to the south and one small and one large reef to the north-west. (18° 57'30" S, 178° 22' W.) It is recorded as being 40 feet high, but is in reality scarcely 30 feet to the tops of the trees.

There is a narrow, winding passage thru the reef off the north end of the island, thru which row boats can enter at moderate or high tide. No anchorage.

[312] No water on the island.

The west side is bordered by a beach of sand and broken coral. The east side has a rocky beach covered with low herbs: Portulaca, Sesuvium and Boerhaavia. The central portion of the island is flat, more or less sandy, and covered with an open stand of stunted "buka" trees (Pisonia ?), 8 to 15 feet high, abruptly truncated on top by the wind and salt spray, and full of nesting boobies. A colony of frigate birds were nesting in the herbs on the south-east side.

The largest land animals besides the birds consisted of geckos, skinks and hermit crabs. Insects included red and black ants, several species of small flies, a robust Sarcophagid fly, small moths, a pale brown cricket, small beetle, mites, crustacia isopod, and spiders.

[223] [484] No sign of inhabitants, although the islet is occasionally visited by natives for birds. No coconut palms.

[p. 18]

●13 4. The YANGASA CLUSTER (pronounced Yang'-a-saw) is made up of four small uninhabited limestone islands, within one lagoon 8 by 6 miles, protected by a subcircular barrier reef which has a two mile break on the north side. They lie about 12 miles north of Fulanga and Ongea Levu, the center of the lagoon being S.18° 56', 178° 29' W. The group is said to belong to the people of Mothe, who gather the copra from several small patches of cocoanut palms.

[423] [245] [284]

YANGASA LEVU, the largest island of the cluster, is 1 2/3 by 1/2 mile, triangular in shape, with a central plateau, 390 feet high. The slopes and plateau are exceedingly rough and heavily wooded, but there is a comparatively level, smooth bench on the east side with a few cocoanut palms in addition to open woods. The west slope of the plateau rises precipitously from the water, but on the east the slope can be climbed in places. No beaches, but landing is possible on the west side of the south point, near which there is one small pool of nearly fresh water, surrounded by a grove of cocoanut palms.

NAVUTU-I-LOMA, the southern islet of the cluster, lies about 1 1/2 miles to the south-west of Yangasa Levu. It is irregularly oval in shape, 1/2 by nearly 1 mile. The surface is densely covered with lowland forest and for the most part exceedingly rough. On the N.E. side a ridge rises to a height of 210 feet. On the S.W. the land is low with deep bays choaked with mangrove swamps. The central portion is flat. A small bay with sandy beach offers good landing at the S.W. point. Opposite this bay the anchorage is good. There are other sand beaches and three small crescent shaped islets on the N.E. side.

YAVUTHA lies 1 1/2 miles to the N.W. of Navutu-i-loma. Though little more than a quarter mile in diameter it reaches an elevation of 240 feet in a sharp peak on the S.E. It is densely wooded with the usual lowland forest and has quite a grove of Casuarina trees on

[p. 20]

[YANGASA CLUSTER]

13 the N. and N.E. slopes. There are no beaches. Landing is possible in smooth weather on the west side.

NAVUTU-I-RA , a mile further to the north-west, is 1/2 mile in diameter and 270 feet high. It is connected with Yavutha by a narrow sunken reef on which are situated a number of small rocks. The slopes of this island are quite rough, but there is a small, nearly level flat on the N.W. Both flat and slopes are heavily wooded. A small sand beach on the south side makes landing easy.

[312] There is no fresh water on the three smaller islets, and only the one pool noticed on Yangasa Levu.

Snakes are abundant and rats are probably present. Lizards and hermit crabs are ~~abundant~~ numerous.

These limestone islands have an exceedingly rough surface, which warrents the nick-name "bad-lands". This consists of jagged ridges (or rather hummocks, as they lead nowhere), separating pot-holes up to 50 feet in diameter and often 15 to 25 feet deep. The walls are sh eer and unbelievably rough and jagged, ruining shoes, clothes and skin. This type of country, however, is well forested.

[p.21]

●13 5. NAMUKA-I-LAU lies about 8 miles N.W. of the Yangasa Cluster.
[361] (Village: S.18° 51', 178° 38' W.)It is rectangular in shape, a little over 4 miles long by 1 broad, and composed of coral limestone. A barrier reef, reduced to a chain of coral heads on the N.W., surrounds the island. On the north side of the island a rough ridge of upraised coral limestone rises abruptly from the sea to a height of 260 feet, and on the S.W. there is a short ridge up to 240 feet high.
[361] The village is located on a large bay facing the south, and another sandy bay is located at the west end. Each contains two small islets. The interior is a flat covered with extensive groves of coconut palms and cultivated areas. Along the ridges and at each end is lowland forest. There is a small marsh near the village.

The south bay is shallow and inaccessable. Good anchorage may
[487] be had within the reef off the north side. A trail leads over the ridge from a landing situated half way between the highest peak (260') and a more conspicuous double peak (210'), near a coconut grove.
[312] Rainwater is caught and stored at the village.

No land snakes, but water snakes are to be found occasionally on the rough coral beaches. Rats, hermit crabs and lizards are present. Mosquitoes and dragonflies ~~[illegible]~~ numerous.

361 The village is of moderate size, with over 50 houses and a pop-
161 ulation of about 216. The inhabitants are industrious and prosperous
181 cutting a large amount of copra and farming extensive cultivated areas.
245 There is a Chinese store. There is considerable beating of masi (tapa),
241 but very little carving.
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[p. 23]

13 6. MOTHE is a moderate size volcanic island, 18 miles north of the Yangasa cluster and 12 miles N.E. of Namuka-i-Lau. The barrier reef which surrounds it stretches 7 miles to the south-west in a sweeping horn called Kapotu, and also encloses a small limestone island, Karoni.

Mothe is 2 1/4 by 2 miles, with smooth, brown, grassy slopes rising to 590 feet in a tree capped peak, Dilli Na Kotu. These slopes are cut by several deep valleys, in which flow small streams of murky water. The beach and valley bottoms are lined with littoral and lowland trees and groves of coconut palms. Much of the beach is sandy. There is a wide, flat reef fringing the south and east sides.

Small cutters can enter the lagoon by a passage near the middle of the east side, east by north from Karoni. For larger vessels there is good anchorage (called Na Kuku) off the N.W. end of Mothe (outside the reef).

Besides the grass there is considerable scrub, ferns, and scattered Pandanus and Casuarina trees on the hills. The summit forest tuft consists of lowland trees only, which have worked up the valleys.

Animals, other than birds, include rats, lizards and banded water snakes.

361 There are two villages: Nasau, the larger, on the south point, and Leva or Na Koro a scant half mile up the east coast in a small bay. Both are surrounded by extensive groves of coconut palms.
226 There is much fishing, a little cultivation, and some masi beating
241 and mat weaving. Pigs and fowl are raised.
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285
231 Karoni is 2 1/4 miles south south-east from the south point of Mothe. It is a typical rough limestone island, supporting a
13 thick growth of trees. The main island is sub-circular, but a number of small islets complete the circle. The east and south sides

[KARONI I.]

13 are low with deep indentations and mangrove thickets. The north-west end rises abruptly from the water in a 120 foot hill, which also slopes steeply on the land side.

There is one small grove of coconut palms. Lizards, snakes and hermit crabs are present. White terns numerous in addition to the usual birds.

484 161 313 487 The island is uninhabited, but is occasionally visited by the natives of Mothe, especially for timber, there being a trail cut into the interior.

[p.26]

13 7. ONEATA is a partly coral limestone, partly bedded sandstone island, lying about 12 miles north of Mothe. (S.18° 25', 178° 30' W.) It is 2 1/2 miles long and about 7/8 mile wide, pointed at both ends, and with three small wooded peaks up to 160 feet high on the south-east. Toward the east end there are two cross-ridges covered with forest. Off the east point a small conical islet, Loa, rises to a height of 140 feet. The west end has a sandstone hill, covered with grass, scrub, Pandanus and Casuarina. A volcanic ledge borders the east point. The central portion of the island is occupied by a narrow brackish swamp. South of it (between the two villages) are to low knobs or ridges of sandstone. On the north side of the low central depression is a large area of coconut palms and cultivated patches.

The island is surrounded by a long triangular barrier reef, extending six miles to the eastward and four to the north-west. Thru it there are four passages, three on the west and one on the north. The water is moderately deep within the lagoon, except off the S.W. point of the island. There is good anchorage off the main village, Wainggori, in the S.W. bay.

312 Water is abundant. It is piped to Waing-gori from a spring in the west end sandstone hill, which is said to run all year round. There is also a fresh water bathing pool near the swamp. Rainwater is caught at Dakuiloa, the other village.

13 In addition to the usual lowland and littoral trees, noted "yasi" sandlewood. Land birds numerous, but no water birds seen. No snakes reported. Aquatic insects numerous, and mosquitoes very troublesome.

361 There are two villages, Wainggori (Waigori) and Dakuiloa, both
[161] situated on the south side. The former claimed a population of 250 although the 1921 ~~census~~ census gives the figure 138. There were

F. KOMO is a small island of volcanic origin lying 9 miles north of Namuka-i-Lau and 6 miles west by south of Mothe. (S.18° 41', 178° 59' W.). It is sub-crescent shaped, 1 1/2 miles long by 3/8 mile wide. On the north a ridge rises to an elevation of 270 feet from the sea, with moderately steep slopes; covered with grass, scrub, Pandanus and Casuarina trees. The summit is crowned by a small patch of coconut palms. The south side and west end are flat with cultivated areas and small groves of coconut palms.

Komo Ndriti, a small, rough, wooded islet of upraised coral limestone, lies a half mile off the west point.

A barrier reef encloses these islands on three sides, the northwest being open except for coral heads and a few small patches of reef. Here there are two good ship passages, 320 and 550 yards wide.

Although there are one or two small murky streamlets, rainwater is caught and stored in the village for drinking purposes.

Birds, lizards, rats and hermit crabs are the only wild land animals. Insects not very abundant and landshells scarce.

The village is located on the S.E. side, and consists of about 25 houses. The natives, about 140 in number, are great fishermen, the women using hand nets and basket traps, plated from beach vine, near shore, while the men fish on the reef. They raise a few domesticated pigs, fowl and dogs. Some little cultivation is done, especially of sweet potatoes.

[p. 31]

13 9. OLOKUA is a small islet of volcanic material, 8 miles N.W. of Komo, surrounded by a semi-frigging reef. It is about 3/8 mile long by 1/4 mile wide, with three hills, the southern one of which rises 250 feet. The west side has so eroded as to disclose an interesting formation of bedded tuff, which slopes outward and downward from the center. The hills are covered with a very open stand of small trees, between which are areas of grass or bare ground strewn with weathered lava rocks.

Near the middle of the east side a depression or mineature valley, with a trickle of marky water, holds a patch of cocomut palms. Another small grove is located directly across the low divide on the west side, and there are a few palms on the S.E. end.

Birds are numerous, including barn owls and ground doves. Lizards, hermit crabs and probably rats present. Insects and landshells very few.

245 [161] 484 There are no inhabitants, but copra is gathered, probably by the natives of Komo.

[p.32]

13 10. KAMBARA is a moderately large, ovate island of upraised coral limestone with a volcanic intrusion at the N.W. end. The island is situated at the S.W. corner of the Lau group. Its south end rests upon the 19th parallel south and its west reef touches the 179th meridian west. It is 4 1/2 miles long and nearly 3 miles wide.

The greater part of the island is a wooded basin, surrounded by a continuous ridge of upraised limestone, up to 350 feet high, which drops abruptly toward the sea. The highest peak on the island, Delaioloi, is of volcanic material, 470 feet high, at the N.W.corner.

There is no harbor, but anchorage in 12 fathoms, sand and coral, may be had with the usual E or S.E. wind, off the N.W. corner, opposite the village of Tokalau. Landing is easy. At this point the barrier reef which surrounds the island is reduced to a line of coral heads.

[312] Water is not abundant on Kambara, but small supplies might be obtained at the villages, where rainwater is caught and stored in cement tanks.

[24] Part of the N.W. end of the central basin has been cleared of forest and planted to sweet potatoes, yams, manioc, pumpkins, bananas and other native foods. The remainder of the basin is covered by a thick, tropical, "lowland" forest. Along the N.W., N.E. and S.E. sides the beach is a sand flat underlain by corse sandstone and covered with groves of coconut palms and the usual beach growth. Portions of the N., W. and E. sides are percipitous undercut cliff.

The familiar land animals; crabs, lizards and rats present. No snakes seen, although the natives report them present.

361 There are four native villages: Tokalau, at the N.W. corner with
[161] 109 natives; Lomati, about a mile down the W. coast, is a small, but
[368] clean and prosperous looking village with an attractive church and
[161] 46 natives; Undu, at the S.E. end, situated in an extensive coconut grove, with 89 inhabitants; and Nggalinggali (Qialiqali), the largest

[KAMBARA I.]

361 [161] of the four, on the east side, a little north of the middle, with 130 residents. A trail leads across the basin from the latter to the 487 241 garden areas, which seem to be cultivated jointly by the people of the three northern villages.

396 322 With the extensive timber at hand, the natives of Kambara have long been noted for their canoe and boat building as well as for various kinds of carving.

13 This is the largest of the dominately limestone islands and would be well worth concentrated collecting.

[p. 35]

● 13 11. MARAMBO Island is a small, nearly circular limestone island located 7 miles east of the south end of Kambara. (Lat.18° 59', Long. 178° 50' W.) The surrounding reef is fringing in character, about 1 1/2 miles on a side. The island is about 1200 yards in diameter, with a rough flat topped hill on the north, "160" feet high (nearer 200 feet), the summit having a densely wooded depression. Between this hill and the west beach, where there is a low ridge, is a small flat, wooded and with coconut palms. South of the hill is a broad area of rough "badlands".

There is no anchorage, but landing is good thru a gap in the reef on the north side, leading to a broad sandy beach.

[312] No fresh water noted.

The surface is covered with the usual thick lowland forest, and the sand beach has an extensive growth of coconut palms and beach plants, especially at the N. and S.W. ends. The usual birds and small crabs and lizards present.

361 The island is uninhabited most of the time. There are four
245 tumbled-down huts on the west side which are occasionally used by the
484 Kambara natives when gathering copra. The 1921 census gives a pop-
161 ulation of 8. At the time of our visit (Aug.26,1924) one of the huts
484 was occupied by a man and two boys, stranded en route from Komo to
241 Fulanga. Most of the island is too rough for cultivation, but in addition to the two groves of coconut palms there is a small cultivated area toward the S.W. end.

[p.36]

● 13 12. WANGAVA island is of rough upraised coral limestone formation, 3 miles N.E. of Kambara. It is shuttle-shaped, 3 1/2 miles long and 1 mile wide. The island is surrounded by a rough marginal limestone ridge, rising steeply from the sea to 350 feet, enclosing a basin, much of which is occupied by a brackish lake. This lake is much more extensive than shown on charts of the island, being over a mile long and filling the entire N.E. two-thirds of the interior. The S.W. end is an undulating wooded plateau, with a few patches of cocomut palms and widl lemon trees. There is also an extensive grove of coconut palms at the N.E. end of the lake, and small patches along its shore.

The rough, "badlands" of the surrounding ridge are covered with the usual lowland forest. The sand beaches have the usual littoral vegetation, including Erythrina indica, not seen on every island. The interior [139] contains plenty of good soil for cultivation, none of which is in use.

Landing is favorable on the N. side, where there are several sand beaches and the surrounding barrier reef is broken up into patches of coral heads. Anchorage may also be obtained here with an off shore 481 (E. to S.W.) wind. A trail leads into the interior from a sand beach 312 at the N.W. end. No fresh water seen.

361 The island is uninhabited, but there are some huts on the N.W. 161 beach, used by natives from Kambara, collecting copra. In the interior 245 trees have been felled in places.
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[p.37]

● 13 13. TUVUNASITHI is a very small island of upraised coral limestone, 13 miles N.W. of Wangava and 25 miles S.W. of Olorua. It is sub-circular in outline, 1/2 mile in diameter, and rises in a steep, crescent shaped ridge on the east side to 200 feet elevation. It is surrounded by a fringing reef with no entrance. The S. and E. sides are rocky, the N. and W. sandy. The east ridge and west flat both consist of well forested coral "badlands".

There is no anchorage. Landing is possible on the N.W. side at half tide or higher; a small break in the reef giving access to a sandy basin from which the sand beach may be reached.

[312] There is no fresh water.

There is the usual littoral vegetation, the north and west beaches having more Pemphis than usual. There are small clumps of coconut palms.

295 161 361 The island is uninhabited, but the copra is collected and there is a small hut on the N. beach.

[p. 38]

13 14. AIWA ISLANDS. Two small uninhabited islands of upraised coral limestone, about 12 miles S.E. of Lakemba. (18° 20' S., 178° 41' W.). They are each about a mile long by 600 ~~yards~~ yards wide, lying in nearly a straight line, with their ends close together and connected by a sunken reef. An elongate barrier reef extends out from each side for 3 or 4 miles, being continuous across the south side, but reduced to broken patches and coral heads on the north. The islands rise abruptly from the water in rough undercut cliffs to a height of 150 to 200 feet, but they are comparatively flat and even on the tops.

Anchorage may be had on the N. side of the western island, there being a broad clear entrance to the lagoon on the N.W. Landing is good in a small sandy bay at the east end of the western islet. It is more difficult, but possible, on the eastern islet, in places along both the N. and S. sides, the latter being better at low tide.

There are numerous caves in the limestone walls, and one large broken in cavern in the east central portion of the western islet, at the bottom of which there is a pool of brackish water. There is no [312] fresh water on the islands except immediately after rains, when a little rainwater collects in open depressions.

The interior flats are covered with the usual lowland vegetation, open and park-like. There is a patch of introduced weeds and a few coconut palms near the sand beach on the western islet. On the eastern islet there is a small area of reed or nasau grass, with Pandanus trees. There is no cultivation.

[423] A flock of goats was placed on the islets by the late owner, a native chief residing on Lakemba. There are the usual birds, lizards, crabs and 489 snakes. The islands are occasionally visited for copra and goat hunting. 295 224

[p. 40]

● 13 15. LAKEMBA is a large volcanic island located at approximately the center of Lau, (18° 12' S., 178° 47' W.). It is nearly oval in outline, 5 1/2 miles east and west by 3 1/2 miles north and south, with a wooded limestone point extending south another mile from the center of the south side. The interior is high, rounded and grassy, with numerous radiating valleys, and several peaks, all of about the same height, up to 720 feet elevation. At the N.W. end there is a conspicuous, wooded, flat-topped peak of upraised coral limestone, rising percipitously to a height of about 400 feet.

There is a well situated harbor for small craft on the S.W. side, off the village of Tumbou. It is difficult of access, thru a 30 yard entrance, because of the tide rip. Larger vessels can find anchorage within the lagoon formed by the barrier reef which extends several miles to the eastward, there being an entrance on the south-east. The island is surrounded by a fringing reef. There is an anchorage outside the reef off the west end, with an off-shore wind. On the north side the reef dries at about a quarter tide, forming a broad mud flat.

[312] Water is abundant and fairly accessable. There is a stream in every valley, and also a convenient pool on the beach near the west end anchorage, behind which rises an elevated limestone bluff. Supplies [366] may be obtained both at Tumbou and at a store near this west end pool.

The hills are covered with reed (or nasau grass), Pandanus, scrub, [241] and Casuarina trees. The valleys are fertile with extensive cultivated patches. A continuous line of coconut groves, together with other beach plants, fringe the shore. The limestone areas are well forested and on the east side, along the shore of the lagoon, there are extensive mangrove thickets.

Small animals and insects as on other islands of the group. The mosquitoes were abundant and troublesome. Quite a variety of bird life.

• 13 16. MBUKATATANOA (OR ARGO) REEF, lying to the east and north-east of Lakemba, contains two small, uninhabited coral islets, near its north end.

Vanua Masi, the larger, is not as large as given in the U.S.Pilot Book (Vol. 166, p.377), being only about 400 by 100 yards, and probably less than 80 feet high. Anchorage is good off the north side of the island. Landing is easy on a sand beach on the north side, behind which is a small clump of cocomut palms, bananas, papayas, and a few species of widespread littoral trees,-- whits with bird guano and stunted by wind and salt spray. The rest of the island is very rough limestone with a few shrubs, herbs and vines. Numerous outlying rocks on the platform-like reef, especially off the east end. The above dimentions include the fringing reef platform.

Insects abundant as to numbers, but few in species. Landshells under drift wood and cocomut husks. Hermit crabs, lizards and water snakes present.

Bacon island, about 2 miles east, is 80 or 90 yards long (N.& S.), and less than 40 or 50 yards wide, tapering at both ends. It also is composed of jagged limestone, rising to a height of 45 to 50 feet. Small pockets of dirt on its steep sides, richly impregnated with bird guano, give growth to such herbs as Sesuvium, Portulaca, stunted bunch grass, and a small shrub.

Water snakes and lizards abundant in crevaces. Only half a dozen species of insects present, but abundant.

Both these islands are used as a nesting place by sea birds.

[p.45]

● 13 17. REID REEF, 4 1/2 miles north of Mbukatatanoa (or Argo) Reef, encloses a lagoon, Reid Haven, containing three coral rocks or small islets, which are nearly bare of vegetation, and are the resort of numerous sea birds.

Latei Viti, the largest of the three, is triangular in shape, about 50 yards on a side, and 60 feet high, of rough coral limestone. Its sides are so covered with bird guano as to appear whitewashed. Small terraces on the north and east have pockets of dirt supporting a small growth of such herbs as Portulaca and Boerhaavia. Lizards and water snakes numerous. About half a dozen species of insects. The south side rises in a steep cliff, at the foot of which are a number of detached and semi-detached rocks.

Latei Tonga lies about three miles to the S.S.E.. It is kidney-shaped, about 60 yards long by 30 wide, and attains a rugged height of perhaps 50 feet in a steep hill on the south. It is similar to Latei Viti in its white jagged cliffs. The north end is low, or with small patches of Portulaca, Sesuvium, Boerhaavia and a mat grass, rising in terraces toward the south. These terraces provide a nesting place for boobies and terns. There are also lizards, water snakes and red-legged hermit crabs. Insects, more numerous than on Latei Viti, include ants, dermestid beetle and small black beetle under dead birds; black agromyzid fly, greenish cranefly, and fuscous leaf-hoppers on the plants; 2 species of small weevils, a mite, and more ants among roots; some small moths and the booby hippoboscid fly.

Booby Rock is a small dark colored coral rock ten feet high, about a mile and a half south-west of Latei Viti. It is bare, even of birds.

[p. 47]

● 13 18. YAROUA is a small sand island, nine miles east of the south point of Tuvutha' I. and 20 miles W.N.W. of Reid Reef. It is surrounded by a fringing reef, varying from 200 to 400 yards wide. The island is flat, smoothly oval in outline, about 500 yards long by 300 to 400 yards wide, and 70 feet to the top of the coconut palms, which thickly cover its surface. This vegetated portion is surrounded by a broad steeply sloping sand beach.

Landing would be possible at high tide off the N.W. point, but as wind and tide were unfavorable we did not stop.

[361] On the N.W. point are a few huts, which were occupied at the time of our visit. The coconut grove, which is similar to that on Wailangilala, should produce some little copra. There were no canoes on the beach.

The two reefs, Thakau Nokova and Thakau Lasemarawa lie respectively two miles to the east and three miles south. The latter contains rocks rising to a height of three feet.

[p. 49]

● 13 19. KATAFANGA (or Katavanga) is a small island of limestone and volcanic material, lying 23 miles S.E. of Munia and 19 miles N.N.E. of Tuvatha'. (S. 17° 51', 178° 43' W.) It is 3/4 mile long and 800 yards wide on the north, tapering toward the south, and rises in two rounded hills to a height of 180 feet. The northern third of the island id densely wooded, rough upraised coral limestone; the southern two-thirds, rounded volcanic material, covered with grass and groves of cocoanut palms. The transition between the two is the most striking seen in Lau, as sharp as if cut by a knife. The southern portion is bordered by a broad beach of sand and slab sandstone.

The island is surrounded by a barrier reef thru which there is a passage on the north side which will admit small vessels drawing 10 feet or less. This passage is not the eastern one, generally indicated on charts, but the narrow one directly north of the N.E. point of the island. In it there are two or three coral heads, but with a favorable tide and commanding breeze small vessels may enter. A desirable 361 anchorage is to be had off the S.E. side of the island, opposite the owner's house, where landing is good.

423 245 The island is freehold property, owned by Mr. T.O.U.Stockwell, who lives on the island and is engaged in producing copra. There is no 464 native population other than his six workmen. Water may be obtained 312 together with small supplies of yams, sweet potatoes, papayas, pigs, etc. 262 Bird and insect life abundant on this luxurient little island. The 13 usual lizards and land crabs present in some numbers.

[p.51]

13 20. VEKAI is a small coral islet, 30 feet high and about 800 yards long, situated on the east inner edge of a circular reef, six miles W1 by S. from Katafanga. The lagoon is about 2 miles across with a boat entrance on the N.W. side (2 fathoms). The islet is wedge-shaped, with small sand beaches in the S.E. bay. The west side rises perpendicularly from the water, but the east slope is gradual, with small pockets running back from the sandy coves. These are filled with stunted trees (Tournefortia, Hernandia peltata, and Ficus), and herbs, vines and a shrub festoon the rough ridges. A small patch of burr grass has somehow been introduced. There are four small detached rocks situated nearby on the reef; one on the west, one off the south point, and two off a projecting S.E. point.

[312] No fresh water. Saw neither lizards or snakes, although both may occur. The white and brown Pierid butterfly is present and several other interesting species of insects.

This islet is especially interesting because it forms a transition between the nearly bare rocks such as Latei Viti and Bacon I. and the small islets, like Vanua Masi, on which trees have become well established, dirt and sand accumulated and cocoanut palms taken root.

[p.52]

13 21. TUVUTHA' is a high, moderate size island of upraised coral with intrusions of volcanic material, 5 1/2 miles south of Vekai. (S.17° 40', 178° 48' W.) It is triangular in outline, 3 1/4 miles long, 1 3/4 miles wide at the north end, and tapering toward the S.S.E. The rough, heavily forested limestone cliffs, rising to a height of 750 to 800 feet on the west, enclose a central basin. The southern end of this is partly filled by a volcanic ridge, covered with grass, Pandanus, and low scrub. The northern portion of the basin is partly wooded, with groves of coconut palms and cleared cultivated areas. There are but [487] two trails leading into the interior. One scales the steep cliff behind Tinoa village and enters by a pass in the high ridge on the S.W. side. The other crosses a low place in the N.E. ridge, behind a sand beach and small volcanic knoll, opposite a boat crossing in the reef.

The island is surrounded by a barrier reef, 400 to 600 yards wide and about 1/2 mile off shore. Anchorage may be had outside the reef at the S.W. end, in the lee of a small horn. There are two boat entrances, one on the west, about 1 1/4 miles N.W. of the village, and the one at the N.E. end. Boats may also cross the reef at high tide near the anchorage at the S.W. corner.

361 The inhabitants, about 100 in number, live in one village, Tinoa, [161] on the S.W. side. Good water may be had from a spring here, but fruit, 312 vegetables and coconuts are only obtainable in moderate quantities. 262 The soil in the basin is fertile, but the difficulty of access prevents 134 extensive agriculture. 241

There are two small reefs, Tavunukui Wai and Tavunukui Vanua, to 13 the south of Tuvutha'. The latter contains a sand cay four feet high.

[p. 54]

13 22. NAIAU is a high limestone and volcanic island, 16 miles N.W.of Lakemba and 20 miles S.W.of Tuvutha'. (S.17° 58', 179° 04' W.) The island is 3 1/2 miles long by 2 miles wide, and is surrounded by a fringing reef. The high marginal ridge of upraised coral limestone, which rises percipitously on the north to 580 feet elevation, surrounds a dry central volcanic basin, carpeted with grass, scrub and Pandanus. The ridges are well forested.

There is no anchorage for vessels, but boats can cross the reef opposite the village of Salia on the east side, and also on the N.W. side, at high water.

312 Water is not abundant, but may be had at the villages, together with limited supplies of staple groceries and vegetables.

361 There are three villages on the island. Salia on the east side
[366] has a native population of 140 and two chinese stores. Narothivo
177, is located about a mile and a quarter to the N.N.W. and has 117
[161] people. Liku, with 59 natives is on the south-east side. There is no landing at Liku, and all supplies and copra has to be carried
487 by trail over the ridges and across the central basin. Gaps in the
13 limestone ridges on each side, with gradual slopes of volcanic material leading up to them, make this trail more accessable than
181 that on Tuvutha'. The people appear to be prosperous and produce
245 quite a little copra from the extensive coconut groves.

172 On the high ridge S.W. of Salia there is the site of an
361 ancient fortified village, perched at the top of a cliff.
712

[p.56]

●13 25. VANUA VATU is a small island of limestone and volcanic formation, 25 miles S.S.W.of Naisu and 22 miles N.N.W. of Tavunasithi. Like Naisu, it consists of a dry, grassy basin of volcanic material surrounded by a ring of wooded upraised coral limestone hills rising to 300 feet elevation on the S.E. and S.W. The elevation of the central basin is from 200 to 250 feet. The island is slightly over a mile square.

It is surrounded by a barrier reef which joins the shore in several places on the west side. On the N. and N.E. this reef lies from 3/4 to 1 mile off shore, but is close in for the rest of its length. With an off shore wind, small craft can anchor over a 9 fathom shelf close to the reef in the N.W. cove. From here a boat passage leads into a sandy basin, but a second reef, between this and the village can be crossed only at high water.

361 There is a single village, Taira, one of the neatest and cleanest seen in Fiji, at the N.W. corner. Contrary to the statement of lack of
181 food made in the Pilot book (H.O.166,p.375), we found the people quite
262 prosperous and both food and water fairly abundant. The central basin
312 is dry and rocky, supporting only grass, scrub and Pandanus, but small
13 pockets of fertile soil among the limestone hills have been cleared and
134 crops of sweet potatoes and yams are raised.
[241]

[p.58]

●13 24. THITHIA (pronounced thō-thō-á) is a moderately large, nearly circular island of volcanic and limestone formation, 17 miles N.W. of Naiau and about the same distance S.S.W. of Mango. The island is about 4 miles in diameter, with the interior undulating grassland, rising in several peaks to a height of over 500 feet. Delana Bo, east of the center of the island, is said to be the highest point, but two peaks on the west marginal ridge are as high or higher. As usual, the ridges of upraised coral limestone are marginal, but here they are somewhat reduced in extent, there being also volcanic ridges [312] on the south, west and north sides. A moderately large stream, flowing to the N.E., drains the central portion, and there are numerous smaller streams. Good water is plentiful.

The island is surrounded by a fringing reef, 300 to 800 yards wide. There is a good anchorage off the village of Tarukua, at the N.W. point, with the prevailing S.E. to E. winds. Here landing is good at any time of the tide. There is also a temporary anchorage off Tambuta Plantation, a mile to the south. There is a small break in the reef opposite 60 yards wide the village of Lomati, but as there is very little protection from the prevailing wind, vessels seldom anchor here.

Snakes are said to be abundant. There are numerous lizards and land crabs. Besides the usual land birds, introduced mynahs and "magpies" are abundant.

There are several caves in the N.E. cliffs, some containing bats, [135] and one said to have a deposit of low grade phosphate.

361 Thithia is one of the most advanced and prosperous islands of Lau. [161] There are five villages with a combined population of over 400. [622] The residence of the Bula[1] is at Tarukua, at the N.W. end, which has 75 [161] natives and a small Chinese store. The district hospital, with a [366] native practitioner in charge, is located here. Kambula, at the S.W. #19 [743] [759]

[p.60]

1 [Buli or chief -- analyst]

13 25. MANGO is a moderately large limestone and volcanic island, 8 miles south of Kanathea, 20 miles W.N.W. of Tuvutha', and 17 miles N.N.E. of Thithia. (S.17° 27', 179° 09' W.). It is surrounded by a fringing reef, about 1/2 mile wide. On the north there is a wide gap in the reef, forming an excellent anchorage with the prevailing S. to E. winds. The island is nearly circular, 3 miles in diamtere, and reaches an elevation (Mt.Rider) on the south of 730 feet according to the owner (the Pilot Book, H.O.166, p.372, gives 670 feet). Two other high volcanic hills overlook the west coast, and there is one nearly as high in the north ridge.

This marginal ring of hills, partly volcanic and partly of upraised coral limestone, encloses a broad central basin which is at present thickly planted to coconut palms. It was formally used for the cultivation of sugar cane, and prior to that for raising cotton. The old sugar mill still stands near the owners houses, toward the center of the basin. From it a small tram line runs to the N.E.bay.

The island is owned by Mr. James Borron, and is managed by his son. There is no native population other than the workmen employed on the plantation, which are mostly Indians. It is one of the most productive and luxurient islands in Lau, and would be well worth an extended biological survey. There is a dense forest among the limestone hills on the N.E., hanging with tropical vines, and with lianas up to 15 inches in diameter. The volcanic hills are covered with the usual grass and scrub, and here and there are groves of Casuarina trees. A small lake, in the N.W.gap, supports a flock of wild ducks, and other bird life is abundant.

Water is abundant. A large stream drains the central basin, flowing N.E. to the nearly enclosed bay. There are also several small lakes and pools of fresh water.

At present about 500 tons of copra are produced annually. A herd

[MANGO I.]

233 [136] of about 700 head of cattle are pastured on the grasslands. A herd The hills are roamed by flocks of turkeys.

● 13 The east bay is of remarkable formation. It is about half a mile long by a quarter of a mile wide, nearly entirely surrounded by a ridge of limestone, and with an entrance scarcely 100 yards wide thru which the flood tide attains a velocity of 7 knots. The tide inside is about half an hour later than outside.

There is a small islet near the outer edge of the reef on the S.W.

[p.64]

13 26. KANATHEA is a circular island of volcanic material, 2 to 2 1/2 miles in diameter, lying 7 miles west of Vanua Mbalavu and 8 miles north of Mango. (S.17° 15', 179° 10' W.) It is surrounded by a fringing reef, and from the east side a loop of barrier reef extends about 6 miles to the N.E., enclosing a spacious lagoon. On the north [509] side there is an indentation in the shore reef within which small craft may anchor within a few hundred feet of a small wharf. The island is undulating and hilly, with several peaks of fair height, the highest (830') overlooking the N.W. shore. On the north-east rises a hill, on the S.E. side of which is a conspicuous thumb-like shaft of volcanic rock. The hills in several places rise in sheer cliffs of this material.

[312] Water is abundant, the interior being drained by several streams.

[245] The valley bottoms and more gradual slopes are thickly planted with coconut palms. The summits of the hills are partly wooded.

423 245 233 136 248 249 162 The island is privately owned and over 600 tons of copra are produced annually. 700 head of cattle are pastured and flocks of ~~###~~ turkeys roam the hills. In former times cotton and later sugar cane were successfully grown. There is no native population, all the workmen being Indians.

As bird life is carefully protected, insects are somewhat reduced in numbers. A strict quarentine is also maintained against weeds.

13

● 13 THE EXPLORING ISLES include a somewhat scattered group of islands: Ngillangilla, Vanua Mbalavu, Avea, Sovu, Malata, Susui, Munia, Thibombia-i-Lau, and small islets, all lying within a single barrier reef, 77 miles in circumference. The greatest length (E.& W.) of the enclosed lagoon is 23 miles and its width (N.& S.) is 21 miles. There are five passages thru the reef: two on the west, Andi wathu and Ngillangilla, opposite those two islets; a series, the Sovu Passages, on the north, near the Sovu Islets; the American Passage on the east; and the Tongan Passage on the S.E., between Munia and Thikombia-i-Lau.

The reef is one of the few barrier reefs in Fiji having a sloping outer edge to windward. On this a vessel might anchor. There is deep water within, with comparatively few reefs and coral heads. Depths of up to 100 fathoms have been sounded on the east, but much of the central portion is from 30 to 50 fathoms.

Ngillangilla, Vanua Mbalavu, Malata, and Susui form a long narrow curve, shaped like a figure "2". The N.W. end is of limestone, the central portion volcanic, and the S.E. is mixed volcanic and limestone material. Ngillangilla and the other small islets close in will be included with Vanua Mbalavu.

103 The group received its name from the United States Exploring Expedition, under Wilkes, in 1840.

[p. 67]

● 13 27. VANUA MBALAVU I. is situated at the western side of the lagoon containing the Exploring Isles. (S.17° 10' to S.17° 20', and 178° 55' to 179° 04' W.) It is 14 miles long and up to 2 1/2 miles wide, with several peaks along its backbone. The N.W.portion, including Ngillangilla I. (510'), which is separated from the main island by a narrow channel, is composed of upraised coral limestone. This continues to be the dominant material south and eastward as far as the two deep bays on the N.E.. On the east side of these the forested limestone cliffs are abruptly replaced by rounded grassy hills. These continue until close to the south end ~~&th~~ which is a narrow limestone ridge. The small islets to the N.W. are limestone. Yanu Yanu, on the S.E. is of volcanic material. The highest peak, Koro Mbasabga (930) and the summits of one or two other peaks of volcanic material are covered with an open growth of forest, similar to that on the high volcanic islands of Matuku, Moala, and Totoya.

361 [423] All of the villages, about 14 in number, are located in the volcanic portion of the island. Nambavatu, in the N.W., is a private estate. Several of the villages were not visited during our short stay, but their populations are tabulated under the Census of Lau.

[648] [344] [368] [177] [563] Lomaloma, with the residence of the District Commissioner, the courthouse, a large native church and ~~&th~~ a few European homes, is situated toward the S.E. end of the island. The northern half of the village (Lomaloma) is Fijian; the southern half (called Sawana) is Tongan, with a separate Buli (chief) and its own city government. The two parts have a combined population of 272. The harbor is well [13] protected, on the east by the islet of Yanu Yanu, and on the N. and S. by outjutting reefs, leaving a small natural basin. In former times [366] Lomaloma was a a large and commercially important place, with several hotels and stores. To it came the old sailing vessels from all parts [439] of the world after copra and native produce from all Lau. But with

[VANUA MBALAVU I.]

361 the establishment of a good stable government in the western part of
[505] Fiji, and cutter service between the various islands and Levuka and Suva, most of its prosperity has vanished.

Another large village is Mualevu, at the east foot of Koro Mbasanga.
[366] This village has a good store and an abundant water supply, piped
[312] down from the adjacent valley, which contains the only real stream seen
[161] on the island. The population is given as 196. All the villages are
[487] connected by good trails.

241 The island is not as extensively cultivated as it might be. There are small areas of native food stuffs planted in the valleys and on the lower slopes behind the various villages. And the flats are occupied
● 13 by small groves of coconut palms. But most of the limestone region remains in native forest, and much of the grassy volcanic ridge is left in that state.

[312] Water is not very abundant, but may be obtained at the villages,
[366] especially Mualevu. Supplies may be secured there and at Lomaloma.

Anchorage is good in many of the bays, besides at Lomaloma, and landing is possible anywhere in the volcanic region and in many of the limestone bays. The limestone country is extremely rough and uninviting, but pockets may be made to support groves of coconuts, as at Nambavatu.

The "Bay of Islands", south-east of Ngillangilla, contains one long low island and several small islets. Here anchorage is good. Andavathi I. (250') and Yanuthaloa I. (160') lie to the S.S.E. of this bay.

[312] There is a hot spring near the gap between the volcanic and limestone formations at the south end.

[p. 69]

●13 28. AVEA is a small island composed of elevated coral limestone and volcanic material, lying a little over a mile off the N.E. side of Vanua Mbalavu. It is 1 3/4 miles long by 1/2 to 5/8 mile wide, pointed at both ends and rising to a height of 600 feet. The center is a small, narrow, wooded plateau, from which rise the two peaks, Salia (600'), and Sangawelangi (about 500'). The slopes rise abruptly from a narrow beach covered with coconut palms. The island is fringed with a coral reef on the east side and is connected to the north reef by a coral strip, over which small boats can pass at any time of tide. On the S.E. side is a grassy volcanic hill, the slopes of which are under cultivation.

361 161 312 487 The village, Avea, is located on the S.W. point and has a population of about 60 natives. There is a small freshwater pool at the foot of a cliff on the south end. A good trail leads from here to the village.

172 The remains of an ancient village occupies part of the flat-topped plateau.

13 29. Malata is a small wooded island, of partly limestone and partly volcanic material. It is a continuation S.S.E. of the limestone ridge at the south end of Vanua Mbalavu, with which it is connected by a broad reef which dries at 3/4 ebb tide, with a gap of only a few hundred feet. The island is 1 1/2 miles long by 1/2 mile wide, and rises to a height in the center of 420 feet.

[361] [291] [295] The village is situated on the N.E. side, where there is a grassy and partly cultivated volcanic hill, with a grove of coconut palms. Other portions of the island are also of volcanic formation.

30. Susui is a somewhat larger island of limestone and volcanic formation, lying to the eastward of the south-east point of Malata, with which it is connected by a reef which dries at 1/2 tide. It is 2 1/3 miles long by 3/4 mile wide. The western half is of wooded, elevated coral limestone,

[p. 70]

[SUSUI I.]

13 the highest portion of which is a central transverse ridge, 430 feet high. The eastern half is a long, grassy flat of volcanic material, thickly covered with groves of cocoanut palms, which run up the eastern slope of the central hill. On the flat are two small hills covered with Casuarina trees. The village of Susui is situated at the N.W. [361] corner of this flat, at the head of a small bay. It has a population [161] of 67. The island is said to be used as a grazing ground for cattle. [233] Considerable copra is also produced.

[245] To the eastward are two small islands. The larger one, 190 feet high, has a small grove of cocoanut palms. The smaller, 80 feet high, rises more abruptly with rocky slopes adorned with Casuarina trees.

[p.71]

13 31. MUNIA is a small volcanic island, 2 1/4 miles long by 1500 yards wide, lying 3 1/2 miles E.by S. of Susui and 15 miles E.by N. of Mango. A high ridge traverses the island, reaching a height of 950 feet near the center. The island is surrounded by a fringing reef, which connects it with the south side of the barrier reef which surrounds the Exploring group. The island is entirely made up of volcanic material.

423 Munia is privately owned, by Mr. H.H. Steinmetz, an Englishman, who
162 produces copra. His homestead is located on the S.E.side at a place
295 where there is a small bight in the reef. Here a pier has been built
361 out nearly to deep water. Anchorage here is fair, except when the
504 strong
13 wind is from the S.E.to N.E. A better anchorage may be found in the lee of the island. Good paths traverse the island and its slopes are
487 thickly planted with coconut palms. Water is fairly abundant, there
312 being several wells.

Mr. Steinmetz has kept careful meteorological records for the
127 past 29 years (1924). A summary of his rainfall data is given in the introduction.

464 There is no native population on the island other than the workmen.
161 er
It formally possessed native inhabitants, however, and bones and ethno-
[172] logical objects have been dug up about the homestead.

[p75]

13 32. THIKOMBIA - I - LAU is a small limestone and volcanic island located on the east side of the lagoon, 5 1/2 miles N.E. of Munia. It is irregularly rectangular in outline, 1 1/4 by 1 1/8 miles, and rises to a height of 550 feet. The western part consists of a volcanic plateau surrounded by a ring of coral limestone hills, thus forming a raised basin, similar to Vanua Vatu. The eastern part is a steep hill with spurs of volcanic conglomerate, separated from the western mass by a low divide connecting the heads of two deep valleys. The south and east sides are furrowed by small valleys or pockets running back from the sea. Here the beach is alternately volcanic rock, sand and sandstone.

361 [161] 291 The village of Thikombia, on the S.W. end, consists of a dozen houses, with a population of 50. There are extensive cultivated areas in the volcanic basin, and small groves of coconut palms along the beach and in the N.E. and S.E. valleys. Water is not abundant, rainwater being caught and stored in a cement tank at the village. 312

13 987 764 172 Vessels may anchor in the lee of the island, and landing is good both at the village and on the north sand beaches. Trails lead up onto the plateau from both the north and south sides. A burial cave containing numerous skeletons was explored on this plateau.

[p. 76]

●13 33. The SOVU ISLANDS, three small uninhabited limestone islets, are situated on the north side of the lagoon, 4 miles E. by N. from Avea, and 6 miles N.by W. of Thikombia-i-Lau.

The larger ~~&&&~~ islet, on the west, is about 3/8 mile long by 100 to 200 yards wide, with a height of 230 feet. It is composed of very rough upraised coral limestone, rising abruptly from an undercut ledge on all sides, and is similar to the Yangasa islets. It is densely covered with lowland forest, herbs and vines.

The middle islet is subcircular, with gentle slopes, about 200 yards in diameter and about 60 feet high. There is a small sand beach on the N.W. and another on the S.E. The slopes are wooded and there are a few coconut palms. It is composed of elevated coral limestone, but is less rough than the larger islet.

The small, eastern islet is elliptical in outline, about 125 yards long, 40 to 50 yards wide, and 60 to 75 feet high. Its rough coral sides rise abruptly from the water, and its top is covered with vines, scrub, and a grove of native fan palms. There are also a few of these palms on the largest islet.

The usual lizards, water snakes and land crabs, including the large red-brown coconut crab were present. No fresh water was seen on any of the ~~&&~~islets. [312]

Anchorage is good on the lee side of the islets. Landing is possible on all three, but easy only on the middle islet.

[p.77]

13 [161] 34. The KIMBOMBO IS. are a group of 3 small, uninhabited islets, 6 miles north of the N.W. end of Vanua Mbalavu and 13 miles eastward of Naitaumba. They are surrounded by a barrier reef, 4 1/2 miles E.& W. by 3 miles N.& S. An entrance on the N.W. admits vessels into the lagoon, where good anchorage may be found.

The largest islet, the south-eastern one, is sub-crescent-shaped, about 300 by 400 yards. It is composed of exceedingly rough coral limestone and surrounded by an undercut shelf. The islet slopes up gradually from the N.& W. to a height of 190 feet, to fall sheer to the water on the east. The slopes are densely covered with the usual trees, shrubs and herbs found on rough limestone islands. There is no fresh water [312] and insect life is scarce. A number of "flying foxes" (fruit bats) and the usual land crabs were seen. There are two small rocks off the N.W. side.

The middle islet, although only 200 or 300 yards to the N.W., is composed of conglomerate and bedded tuff of volcanic origin. The bedded strata dip to the E. and N.E. at an angle of about 30°. The islet is 100 by 60 yards and 120 feet high. It slopes up gradually from the S.E. with a cliff on the E. and N.W. A sand beach borders the W. and S.E. [361] sides, with a hut and small grove of coconut palms. The rounded summit is covered with small trees, and the slopes with casuarinas.

The small islet, on the W., is a steep pinnicle of tuff and conglomerate, about 100 feet high. completely surrounded by a sand beach, with cocomut palms on the south and a few small trees on the summit. A line of reef runs out to a patch of flat rocks on the N.E., and a similar reef connects the islet with two flat rocks to the south.

114 The observations of Agassiz (Bull.Museum Comparative Zoology, XXXIII, p.88, 1899), that the highest island is volcanic and the other two of elevated limestone, is incorrect.

[p.74]

●13 35. WAILANGILALA is a flat sand island underlain by coral limestone, a mile long and 600 yards wide at its widest ~~point~~ part. It is the most northern of the Lau Group, lying 18 miles N.N.W. from Kimbombo Islets. (S.16° 45', 179° 06' W.). The island is surrounded by a barrier reef, 2 1/2 miles wide (E.& W.) by 3 3/4 miles N.& S. Thru this there is an entrance on the west 240 yards wide which admits vessels into the lagoon, where good anchorage may be found.

The island is thickly covered with littoral plants and coconut palms, reaching a total height of 70 feet above sea level. Toward the north there is a bare narrow isthmus, with a wooded section beyond, giving the appearance of two islands.

349 On the S.W. side is a 95 foot circular, white iron tower, with a 36 flashing white light, visible 15 miles. The lighthouse keeper and his 241 assistant have neat substantial homes near by. They cultivate small garden plots and dry copra from the extensive coconut grove. Some [312] vegetables and papayas may be obtained. Rain water is stored in a tank.

114 An account of a boring made on this island in 1897 is given by Alexander Agassiz in the Bulletin of the Museum of Comparative Zoology, Cambridge, Vol.XXXIII, pp.45 to 48, 1899. The island must have changed considerably in shape since that time, as it does not at present agree with maps given on pages 45 and 46. Even the position of the light-house is different.

[p.81]

13 56. NAITAUMBA is a trapezium-shape volcanic and limestone island, lying 15 miles N.W. of Vanua Mbalavu and 18 miles S.W.of Wailangilala. It is surrounded by a barrier reef which lies from 1/4 to 3/4 mile off shore. On the west the reef is reduced to a line of coral heads and patches. Here small boats may enter. Vessels may anchor, with an off shore wind, on a narrow shelf off this west side.

The island is 2 miles E.& W. by 1 1/2 miles N.& S. A central basin is surrounded by limestone and volcanic hills, the highest, on the S.E., reaching an elevation of 610 feet in a flat-topped volcanic peak rising with steep slopes. The limestone portions, especially on the N.E. and N.W. are densely wooded; the volcanic hills are covered with the usual grass, scrub and pandanus; and the basin contains an extensive grove of coconut palms.

423 The island is privately owned by Mr.G.M.Henning, who resides at a
361 homestead on the west side. Considerable copra is produced. Fresh
245 water is abundant, and small quantities of produce, turkeys, etc.,
312 might be obtainable at the homestead. Good trails traverse the island.
487 There is no native population other than the plantation workmen.
161
469

The MALIMA Islets, two small uninhabited islets lying 6 miles S.E.
13 of Naitaumba, were not visited. They are surrounded by a continuous circular barrier reef, about 2 miles in diameter, with a small boat passage on the north side. The larger islet reaches a height of 130 feet in a conspicuous lump on its S.W. end. The lagoon contains numerous rocks and coral heads.

[p.83]

13 [103] 37. YATHATA (or Cap island, so called because its profile resembles a cap with button) is a limestone and volcanic island, lying 18 miles S.W. of Naitaumba and 19 miles west of Kanathea. (S.17° 16', 179° 32' W.) It is surrounded by a fringing reef which also encloses the low limestone island of Kaimbu and several smaller islets and rocks. There is a boat passage on the N. side with good landing on a sand beach toward the N.E. end. There is no anchorage.

The island is 1 1/2 miles E.& W. by 1 1/2 miles wide. Toward the center there is a steep, flat-topped, wooded limestone peak, 840 feet high and on the S.E. a rounded, grassy volcanic hill. The coast on the east and N.W. is sandy with groves of coconut palms, and there are [241] cultivated areas on the S.W. side of the central peak.

36 368 312 487 172 712 13 The village, with 25-30 native houses and a frame church, is located on the east side. S.W. of the village is a small fresh water pool. The island is traversed by trails. The ruins of an ancient fortified village occupies the summit of the central peak, Na Koro Levu (840'). The volcanic hill, called Dilla Thata, is about 500 feet high.

38. KAIMBU was not visited. It is about 1 1/2 miles long (NW-S.E.), by 13 1/2 mile wide. It is composed of elevated coral limestone, with a flat surface ~~averaging~~ 150 feet high. Portions are wooded, and others partly [241] cultivated. The small village is on the N.W. side.

[361] The small sand islet of Mukuluve, between Yathata and Kaimbu is densely covered with coconut palms. The 90 feet elevation is to the top of the vegetation. The other small islets, 20 to 30 feet high, are mostly coral limestone and of no great consequence.

[p.85]

13 39. NUKUTOLU ISLETS are three in number, composed of sand and coral reef, and situated about 4 miles westward of Yathata.

The eastern islet is the largest, eliptical in outline, about 350 yards N.& S. by 250 to 300 yards wide, and covered with littoral trees and coconut palms, 100 feet to the top of the vegetation. It is surrounded by a fringing reef, reaching about 1/4 mile off shore.

The middle islet is somewhat smaller and lower, being about 80 feet to the top of the vegetation, with a few coconut palms on the S.W. side. The trees are here reduced to stunted scrub. The fringing reef lies about 1/4 mile offshore on the N.w., and closer on the east. On the south it makes a sharp elbow and extends westward to the western islet in a narrow arm. There is a small rock at the elbow.

The western islet is the smallest, not over 40 or 50 feet high to the top of the bushes. It has a small flat, with an open covering of scrub and vines. To the south, a rocky shelf extends above water for about 100 yards.

We found fair anchorage on a shelf in the cove, west of the middle islet. The islets are uninhabited, but are occasionally visited by the natives of Yathata for cocomuts and turtle.

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[p.86]

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[103] 40. VATU VARA I. (or Hat island, because of its resemblence, in profile from the E. and W., to a slouch hat) lies 9 miles south of Yathata. (S.17° 26', 179° 32' W.) It is surrounded by a fringing reef with a small shallow lagoon on the west. This island is the highest in Lau, the bold central peak rising to a height of 1030 feet. The slopes
[192] of this peak rise percipitously to a flat, crater-like summit, where the
[712] ruins of a fortified village are located.

The island is sub-circular, about 1 1/4 miles in diameter, with a square point on the S.E. It is composed of upraised coral limestone, densely wooded, and with small groves of coconut palms in pockets around
423 the foot of the talis slopes, and on the beaches. It is privately owned
361 by the estate of the late Captain Wilson. The neat, substantial home-
245 stead is located on the west side. Copra is produced.

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502 Landing may be made without difficulty on ~~the~~ a sand beach on the N. side, thru a small break in the reef, marked by a beacon.

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161 There are no inhabitants except the caretaker and a few workmen.
312 Water is not abundant, and but little cultivation is done.
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[p.88]